

SEQUENCE LISTING

<110> E. I. du Pont de Nemours and Company
<120> Genes Encoding Sulfate Assimilation Proteins
<130> BE-1167-B
<140>
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<150> 60/092,833
<151> July 14, 1998
<160> 14
<170> Microsoft Office 97
<210> 1
<211> 890
<212> DNA
<213> Zea mays

<400> 1
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ccgtcgaa atcgacgaac atccgtggc atgagtgccgc catcgggcag aaggagcgac 120
agggtctgtc gaaccagaag ggctgcgtcg tttggatcac tggcttaagc ggttcaggga 180
aaagcacgtc cgcgtgcgc ctgagccgcg agtgcacgg cagaggccac ctcacgtacg 240
tcctcgacgg cgacaacctc aggacacgggc tgaacaggga cctcagcttc ggagcagagg 300
accgcgcga gaacatccgc agagtagggg aagtagcggaa gctgttcggcc gacgctggcc 360
tcgtctgcat cgccagcctc atatgcctt acagaagcga cggaaagcgcg tgcgcgatc 420
tgctgcccga gcactcggtt atcgaggtgt tcctggacgt ggcgttcaa gtgtgcgaag 480
ccagggaccc caaaggcctc tacaagctcg cacgcgcgg caaaatcaa gggttcaccg 540
gcatcgacga tccttacgaa cccgcgtcg actgtgagat agtgcgtccag tggaaagtgc 600
gcaactgccc ttgcctgaa tcgatggctg gtcacgtgt gtgttgcatt gagacgaatg 660
gtttcctcca ggactagaca tggaaatgcga tcgatgcgtc tgatgtgtat atatgttagca 720
gcagccggag cggcattggcc aaggtgtgt aatctcatgg ctgtcttct cttaagacc 780
aaaacaaaca agagatggca gtgtaaaaaa gaaaaaaaaa atgcgtctg acagagtcgc 840
tgaatcaacc atgcttctga taaaaaaaaa aaaaaaaaaa aaaaaaaaaa 890

<210> 2
<211> 224
<212> PRT
<213> Zea mays

<400> 2
Ser Ala Ala Ala Ala Val Ala Gly Ile Ser Ser Ser Ser Ser Ala Leu
1 5 10 15
Val Thr Ser Thr Val Gly Lys Ser Thr Asn Ile Leu Trp His Glu Cys
20 25 30
Ala Ile Gly Gln Lys Glu Arg Gln Gly Leu Leu Asn Gln Lys Gly Cys
35 40 45
Val Val Trp Ile Thr Gly Leu Ser Gly Ser Gly Lys Ser Thr Leu Ala
50 55 60
Cys Ala Leu Ser Arg Glu Leu His Gly Arg Gly His Leu Thr Tyr Val
65 70 75 80

Leu Asp Gly Asp Asn Leu Arg His Gly Leu Asn Arg Asp Leu Ser Phe
85 90 95

Gly Ala Glu Asp Arg Ala Glu Asn Ile Arg Arg Val Gly Glu Val Ala
100 105 110

Lys Leu Phe Ala Asp Ala Gly Leu Val Cys Ile Ala Ser Leu Ile Ser
115 120 125

Pro Tyr Arg Ser Asp Arg Ser Ala Cys Arg Asp Leu Leu Pro Lys His
130 135 140

Ser Phe Ile Glu Val Phe Leu Asp Val Pro Leu Gln Val Cys Glu Ala
145 150 155 160

Arg Asp Pro Lys Gly Leu Tyr Lys Leu Ala Arg Ala Gly Lys Ile Lys
165 170 175

Gly Phe Thr Gly Ile Asp Asp Pro Tyr Glu Pro Pro Ser Asp Cys Glu
180 185 190

Ile Val Ile Gln Cys Lys Val Gly Asp Cys Pro Ser Pro Glu Ser Met
195 200 205

Ala Gly His Val Val Ser Tyr Leu Glu Thr Asn Gly Phe Leu Gln Asp
210 215 220

<210> 3

<211> 1217

<212> DNA

<213> Zea mays

<400> 3

gcgtccgtt cattcatca atcaaacaga acctctggc acacacacgc agcaaccacc 60
gagcccgacg cccggcccaag ccagccagg ccaacggcaa ggcaacaccc tcctcagccc 120
gacgcccacg ctgcggctca tcctcgtaaa tccacagcgc ggcctcccg tcctccagg 180
cctcacccct agcgatgcgc cactccggc gctcgtgatc catggcctca ctccccgttc 240
ctcacactct tccgcgggtc tcgcccagtga tagtggggcgc cgcgaggggg agggccgcgg 300
tgcgcgtacg cactgccacc gcgcattgg gcgggtgggtg cggcggcggc ggcggaaatgg 360
agcagcgccc ggggaggccc cgacacagccc agtgaaggag aagcctgtaa tgtcgaacat 420
tgggaaatcg actaatatcc tatggcaca ttgcttgatt ggacaatctg atagacagaa 480
attgctggga caaaaaggct gtgtcgatg gataacagga ctcaatggcgtt cagggaaaag 540
tactcttgca tgtgcactga gtctgtatc gcattgcaga ggcacactca cgtatgtact 600
tgatgggtac aacctcagac atgcctaa tagagatcc agtttaagg cagaagaccg 660
tgcagaaaat atacgaagag ttgtgtaaat ggcaaaatcc ttgtctgtatc ctgggtgtcat 720
atgcattgtc agcttgcatccatccatcag gagatgcgt gatgcattgc ctgtctact 780
tccacattct aactttatcc aagtatccat tgatccatcc ctaaaaatcc tgaaatgtcg 840
tgatccctaa ggcctataca agttgcacg tacaggaaatg attaaatgg tcaatgtccat 900
tgatgtatcc tacgaaccac caattatgg tgatgtatcc attaatggcgttccat 960
atgccttca cccaaagcaa tggccaaatgc agttctatgc tacattgttgc aaaaatggata 1020
tttgcaatgtc tagtataatgt attttgttgc gattgtatgc attttgttgc gtccattact 1080
tgtggacaca ataagatctg ttgttgcgttca catgtatccatcc agtgcgttccat 1140
taacagaagg tacgggttcat tcagaaacgg atatggattc attcgtttaa aaaaaaaaaa 1200
aaaaaaaaaa aaaaaaaaaa 1217

<210> 4

<211> 343

<212> PRT

<213> Zea mays

<400> 4
 Arg Pro Phe His Phe Ile Asn Gln Thr Glu Pro Leu Val Thr His Thr
 1 5 10 15
 Gln Gln Pro Pro Ser Pro Ala Pro Gly Pro Ala Ser Gln Gly Gln Arg
 20 25 30
 Gln Gly Asn Thr Leu Leu Ser Pro Thr Pro Thr Leu Ala Val Ile Leu
 35 40 45
 Val Asn Pro Gln Arg Ala Pro Pro Val Leu Pro Gly Leu Thr Pro Ser
 50 55 60
 Asp Ala Pro Leu Pro Ala Leu Val Ile His Gly Leu Thr Pro Arg Ser
 65 70 75 80
 Ser His Ser Ser Ala Gly Leu Ala Ser Asp Ser Gly Arg Arg Glu Gly
 85 90 95
 Glu Gly Arg Gly Ala Arg Thr His Cys His Arg Gly Ile Gly Arg Trp
 100 105 110
 Val Arg Arg Arg Arg Asn Gly Ala Ala Pro Gly Glu Ala Pro His
 115 120 125
 Ser Pro Val Lys Glu Lys Pro Val Met Ser Asn Ile Gly Lys Ser Thr
 130 135 140
 Asn Ile Leu Trp His Asn Cys Leu Ile Gly Gln Ser Asp Arg Gln Lys
 145 150 155 160
 Leu Leu Gly Gln Lys Gly Cys Val Val Trp Ile Thr Gly Leu Ser Gly
 165 170 175
 Ser Gly Lys Ser Thr Leu Ala Cys Ala Leu Ser Arg Glu Leu His Cys
 180 185 190
 Arg Gly His Leu Thr Tyr Val Leu Asp Gly Asp Asn Leu Arg His Gly
 195 200 205
 Leu Asn Arg Asp Leu Ser Phe Lys Ala Glu Asp Arg Ala Glu Asn Ile
 210 215 220
 Arg Arg Val Gly Glu Val Ala Lys Leu Phe Ala Asp Ala Gly Val Ile
 225 230 235 240
 Cys Ile Ala Ser Leu Ile Ser Pro Tyr Arg Arg Asp Arg Asp Ala Cys
 245 250 255
 Arg Ala Leu Leu Pro His Ser Asn Phe Ile Glu Val Phe Ile Asp Leu
 260 265 270
 Pro Leu Lys Ile Cys Glu Ala Arg Asp Pro Lys Gly Leu Tyr Lys Leu
 275 280 285
 Ala Arg Thr Gly Lys Ile Lys Gly Phe Thr Gly Ile Asp Asp Pro Tyr
 290 295 300

Glu Pro Pro Ile Asn Gly Glu Ile Val Ile Lys Met Lys Asp Glu Glu
 305 310 315 320

Cys Pro Ser Pro Lys Ala Met Ala Lys Gln Val Leu Cys Tyr Leu Glu
 325 330 335

Glu Asn Gly Tyr Leu Gln Ala
 340

<210> 5
 <211> 431
 <212> DNA
 <213> Oryza sativa

<220>
 <221> unsure
 <222> (48)

<220>
 <221> unsure
 <222> (346)

<220>
 <221> unsure
 <222> (431)

<400> 5
 cttacacaga gatcaggtag aacagtggc gagaacaaag ttttgcattt gtcattcaatt 60
 gtgccgaagg cgtccatatat cttctggcat gattgtgcag ttggccaggc tgatcgccag 120
 aagctactga agcagaaagg ttgcgttgg tggatcacag gacttagtgg ttcaggtaaa 180
 agtaccctgg catgcacatt agatcgagag ctccatacaa gagggaaagct ttcttatgtt 240
 cttgtatggtg ataatttaag acatggtttg aacaaggatc ttggctttaa ggcggaagac 300
 cgtgctgaaa atatacgc aaatgggttag gtagcaaagc tattcncaga tgcaagccta 360
 gtatgcattt caagtttcaa atctccctat aagagagaac gtgagtcctg gcccctgcaat 420
 attgtcaat n 431

<210> 6
 <211> 118
 <212> PRT
 <213> Oryza sativa

<220>
 <221> UNSURE
 <222> (98)

<400> 6
 Ser Ile Val Pro Lys Ala Ser Asn Ile Phe Trp His Asp Cys Ala Val
 1 5 10 15

Gly Gln Ala Asp Arg Gln Lys Leu Leu Lys Gln Lys Gly Cys Val Val
 20 25 30

Trp Ile Thr Gly Leu Ser Gly Ser Gly Lys Ser Thr Leu Ala Cys Thr
 35 40 45

Leu Asp Arg Glu Leu His Thr Arg Gly Lys Leu Ser Tyr Val Leu Asp
 50 55 60

Gly Asp Asn Leu Arg His Gly Leu Asn Lys Asp Leu Gly Phe Lys Ala
 65 70 75 80

Glu Asp Arg Ala Glu Asn Ile Arg Lys Val Gly Glu Val Ala Lys Leu
 85 90 95

Phe Xaa Asp Ala Ser Leu Val Cys Ile Ala Ser Phe Lys Ser Pro Tyr
 100 105 110

Lys Arg Glu Arg Glu Ser
 115

<210> 7

<211> 936

<212> DNA

<213> Glycine max

<400> 7

gcacgagcca ccgcgaaggc tctgcgacag ccctgctacg ccggaatctt tcgcaacatc 60
 gaatgcggcc cgtcgcggc ggccggagtcg ctagggtttc cgaagctccg cggaatcaac 120
 gtcactggat tgcactgcgg ccgcgcggc ctcgtccctcg tcctccgtgc aaaatcaaag 180
 ccgatttaggg cgaaggagaa cgcaagcgta agtgcttctc tgatcgatga ctggttcaag 240
 ccaattacgg cgaaggagga ttctaacgca gaggaccgta catttcggtt ttctggtaaa 300
 aatctcaccc agatgtcaaa tggatggaaac tcgacaaaca ttatgtggca tgactgtcca 360
 attcagaaaac aagatagaca gcagctgctt cagcaacaag gctgtgttat atggcttaact 420
 ggccctcagcg gatcaggaaa aagcactatt gcatgtgctc tgatcgatga ctggactcc 480
 aaaggaaaaac tggatggatcat ccttgcgtt gacaatattc ggcattggctt aaaccaggat 540
 cttagttta gaggcagaaga tcgttctgaa aacattagaa ggatgggtga ggtggcaaaa 600
 ctcttgcag atgctgggtt tatttgcattt actatgttta tatcaccata ccaaaaggat 660
 agagatgcatttgcagacttcaaaa ggatggatcat cttgcgtt gatcgatgtt 720
 ccactacatg tggatggatcat cttgcgtt gacaatattc ggcattggctt aaaccaggat 780
 aagatcaaaatggatggatcat cttgcgtt gatcgatgtt 840
 gtattacaac agaaaggaaatggatggatcat cttgcgtt gatcgatgtt 900
 tcctacttgg aggagaacgg atacctgcgg gcttga 936

<210> 8

<211> 311

<212> PRT

<213> Glycine max

<400> 8

Ala Arg Ala Thr Ala Lys Ala Leu Arg Gln Pro Cys Tyr Ala Gly Ile
 1 5 10 15

Phe Arg Asn Ile Glu Cys Gly Pro Ser Pro Ala Ala Glu Ser Leu Gly
 20 25 30

Phe Pro Lys Leu Arg Gly Ile Asn Val Thr Gly Leu His Cys Gly Arg
 35 40 45

Arg Gly Leu Val Leu Val Leu Arg Ala Lys Ser Lys Pro Ile Arg Ala
 50 55 60

Lys Glu Asn Ala Ser Val Ser Ala Ser Leu Ile Asp Asp Trp Phe Lys
 65 70 75 80

Pro Ile Thr Ala Lys Glu Asp Ser Asn Ala Glu Asp Arg Thr Ser Ser
 85 90 95

Phe Ser Gly Lys Asn Leu Thr Gln Met Ser Asn Val Gly Asn Ser Thr
 100 105 110

Asn Ile Met Trp His Asp Cys Pro Ile Gln Lys Gln Asp Arg Gln Gln
 115 120 125

Leu Leu Gln Gln Gln Gly Cys Val Ile Trp Leu Thr Gly Leu Ser Gly
 130 135 140

Ser Gly Lys Ser Thr Ile Ala Cys Ala Leu Ser Gln Ser Leu His Ser
 145 150 155 160

Lys Gly Lys Leu Ser Tyr Ile Leu Asp Gly Asp Asn Ile Arg His Gly
 165 170 175

Leu Asn Gln Asp Leu Ser Phe Arg Ala Glu Asp Arg Ser Glu Asn Ile
 180 185 190

Arg Arg Ile Gly Glu Val Ala Lys Leu Phe Ala Asp Ala Gly Val Ile
 195 200 205

Cys Ile Thr Ser Leu Ile Ser Pro Tyr Gln Lys Asp Arg Asp Ala Cys
 210 215 220

Arg Ala Leu Leu Ser Lys Gly Asp Phe Ile Glu Val Phe Ile Asp Val
 225 230 235 240

Pro Leu His Val Cys Glu Ala Arg Asp Pro Lys Gly Leu Tyr Lys Leu
 245 250 255

Ala Arg Ala Gly Lys Ile Lys Gly Phe Thr Gly Ile Asp Asp Pro Tyr
 260 265 270

Glu Pro Pro Cys Ser Cys Glu Ile Val Leu Gln Gln Lys Gly Ser Asp
 275 280 285

Cys Lys Ser Pro Ser Asp Met Ala Glu Glu Val Ile Ser Tyr Leu Glu
 290 295 300

Glu Asn Gly Tyr Leu Arg Ala
 305 310

<210> 9
 <211> 928
 <212> DNA
 <213> Triticum aestivum

<400> 9
 gcacgagggc ggacgcaggg gagaggatgg cgggtcaga agccgtgccc gtggggctg 60
 tggctgccgg gaagcagccc gtcaatggat cagccatggc aggtatcgac aagcttgtga 120
 cctcaactgt tggaaatcg acaaacgttc tttggcatga ctgtccaata ggtcagttt 180
 agagggcagga actgcttaat cagaagggtt gtgttgtgt gataacaggg ttaagtgggt 240
 caggaaaaag cacactagca tgccgcctaa gtcgcgagct gcactccaga ggtcatctga 300
 cttacattct agacggtgac aatctaaggc atgggttaaa ccgagaccc tggttcgaag 360
 caaaggaccg tgctgaaaat atacgcagag taggagaagt agcaaagctg tttgcagatg 420
 ctggtctgat ctgcattgtc agcttgcatac caccctacag aagtgaacgc agcgcttgc 480
 gcaaattact gcacaattct acattcatcg aggtgtttt gaatgtccca cttgaagttt 540
 gtgaagctag ggatccaaaa ggcttgtaca agcttgcggc tgcaggaaaa atcaaagggt 600
 ttactggaat tggatgtatcct tatgaagcac cttctgactg cgagatagtg atacagtgc 660
 aagctggtga ctgcgccacg cctaaatcga tggctgatca agttgtgtca tatcttgaag 720
 caaatgagtt cttacaggaa tagagacgta tgctatggat gaaaaaacat tctgaaattg 780
 gatcgccaag ggatgtgaaa tatgaggtag tatttatgtc tagaaagagt gatgatagta 840
 tgagaacata tatattgaca taaagatcga atctgtacat cattataata aattgaaatg 900

ttttgacgca aaaaaaaaaa aaaaaaaaaa 928

<210> 10
<211> 246
<212> PRT
<213> *Triticum aestivum*

<400> 10
Thr Arg Ala Asp Ala Gly Glu Arg Met Ala Gly Ser Glu Ala Val Pro
1 5 10 15

Val Val Ala Val Ala Ala Gly Lys Gln Pro Val Asn Gly Ser Ala Met
20 25 30

Ala Gly Ile Asp Lys Leu Val Thr Ser Thr Val Gly Lys Ser Thr Asn
35 40 45

Val Leu Trp His Asp Cys Pro Ile Gly Gln Phe Glu Arg Gln Glu Leu
50 55 60

Leu Asn Gln Lys Gly Cys Val Val Trp Ile Thr Gly Leu Ser Gly Ser
65 70 75 80

Gly Lys Ser Thr Leu Ala Cys Ala Leu Ser Arg Glu Leu His Ser Arg
85 90 95

Gly His Leu Thr Tyr Ile Leu Asp Gly Asp Asn Leu Arg His Gly Leu
100 105 110

Asn Arg Asp Leu Cys Phe Glu Ala Lys Asp Arg Ala Glu Asn Ile Arg
115 120 125

Arg Val Gly Glu Val Ala Lys Leu Phe Ala Asp Ala Gly Leu Ile Cys
130 135 140

Ile Ala Ser Leu Ile Ser Pro Tyr Arg Ser Glu Arg Ser Ala Cys Arg
145 150 155 160

Lys Leu Leu His Asn Ser Thr Phe Ile Glu Val Phe Leu Asn Val Pro
165 170 175

Leu Glu Val Cys Glu Ala Arg Asp Pro Lys Gly Leu Tyr Lys Leu Ala
180 185 190

Arg Ala Gly Lys Ile Lys Gly Phe Thr Gly Ile Asp Asp Pro Tyr Glu
195 200 205

Ala Pro Ser Asp Cys Glu Ile Val Ile Gln Cys Lys Ala Gly Asp Cys
210 215 220

Ala Thr Pro Lys Ser Met Ala Asp Gln Val Val Ser Tyr Leu Glu Ala
225 230 235 240

Asn Glu Phe Leu Gln Glu
245

<210> 11
<211> 521
<212> DNA
<213> *Triticum aestivum*

<400> 11
 gcacgaggct tgcacgcaca ggaaagatta aagggttcac cgaggttgc gatccatacg 60
 aatcaccagt gaatagttag atagtaatta agatggaaagg tggggatgc cttcacccga 120
 agccaatggc ccagcaagtt ctgtcctacc ttgagaagaa cgatatttgc caggcttagc 180
 atatatatac tccagatcca gaagattgaa cttattcttc tgggtccata actcatggac 240
 acaggcatga tccatgggt cgcatccgaa ataaaaggcg ctgttattga agcaacaagc 300
 tgcccttttc acggggaaag ggacgcagat cgatgatcag tttgattgtt cggcatgtc 360
 cctctcgccg gtgttgcgtt attttagctg tagtctatac ttgctcattt cggctgaaat 420
 ggtgtgtgt gctgtgtgt gtttattgt tggtaatgta tgatttgatt gtgggtgtca 480
 aaagtacgaa tgaataaatac gtgcttgcgt tttcaaaaaa a 521

<210> 12

<211> 58

<212> PRT

<213> *Triticum aestivum*

<400> 12

Thr Arg Leu Ala Arg Thr Gly Lys Ile Lys Gly Phe Thr Gly Val Asp
 1 5 10 15

Asp Pro Tyr Glu Ser Pro Val Asn Ser Glu Ile Val Ile Lys Met Glu
 20 25 30

Gly Gly Glu Cys Pro Ser Pro Lys Ala Met Ala Gln Gln Val Leu Ser
 35 40 45

Tyr Leu Glu Lys Asn Gly Tyr Leu Gln Ala
 50 55

<210> 13

<211> 312

<212> PRT

<213> *Catharanthus roseus*

<400> 13

Met Ile Gly Ser Val Lys Arg Pro Val Val Ser Cys Val Leu Pro Glu
 1 5 10 15

Phe Asp Phe Thr Glu Ser Thr Gly Leu Gly Lys Ser Ser Ser Val
 20 25 30

Lys Leu Pro Val Asn Phe Gly Ala Phe Gly Ser Gly Gly Glu Val
 35 40 45

Lys Leu Gly Phe Leu Ala Pro Ile Lys Ala Thr Glu Gly Ser Lys Thr
 50 55 60

Ser Ser Phe Gln Val Asn Gly Lys Val Asp Asn Phe Arg His Leu Gln
 65 70 75 80

Pro Ser Asp Cys Asn Ser Asn Ser Asp Ser Ser Leu Asn Asn Cys Asn
 85 90 95

Gly Phe Pro Gly Lys Lys Ile Leu Gln Thr Thr Val Gly Asn Ser
 100 105 110

Thr Asn Ile Leu Trp His Lys Cys Ala Val Glu Lys Ser Glu Arg Gln
 115 120 125

Glu Pro Leu Gln Gln Arg Gly Cys Val Ile Trp Ile Thr Gly Leu Ser
 130 135 140
 Gly Ser Gly Lys Ser Thr Leu Ala Cys Ala Leu Ser Arg Gly Leu His
 145 150 155 160
 Ala Lys Gly Lys Leu Thr Tyr Ile Leu Asp Gly Asp Asn Val Arg His
 165 170 175
 Gly Leu Asn Ser Asp Leu Ser Phe Lys Ala Glu Asp Arg Ala Glu Asn
 180 185 190
 Ile Arg Arg Ile Gly Glu Val Ala Lys Leu Phe Ala Asp Ala Gly Val
 195 200 205
 Ile Cys Ile Ala Ser Leu Ile Ser Pro Tyr Arg Lys Pro Pro Asp Ala
 210 215 220
 Cys Arg Ser Leu Leu Pro Glu Gly Asp Phe Ile Glu Val Phe Met Asp
 225 230 235 240
 Val Pro Leu Lys Val Cys Glu Ala Arg Asp Pro Lys Gly Leu Tyr Lys
 245 250 255
 Leu Ala Arg Ala Gly Lys Ile Lys Gly Phe Thr Gly Ile Asp Asp Pro
 260 265 270
 Tyr Glu Pro Pro Leu Lys Ser Glu Ile Val Leu His Gln Lys Leu Gly
 275 280 285
 Met Cys Asp Ser Pro Cys Asp Leu Ala Asp Ile Val Ile Ser Tyr Leu
 290 295 300
 Glu Glu Asn Gly Tyr Leu Lys Ala
 305 310
 <210> 14
 <211> 276
 <212> PRT
 <213> *Arabidopsis thaliana*
 <400> 14
 Met Ile Ala Ala Gly Ala Lys Ser Leu Leu Gly Leu Ser Met Ala Ser
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 Pro Lys Gly Ile Phe Asp Ser Asn Ser Met Ser Asn Ser Arg Ser Val
 20 25 30
 Val Val Val Arg Ala Cys Val Ser Met Asp Gly Ser Gln Thr Leu Ser
 35 40 45
 His Asn Lys Asn Gly Ser Ile Pro Glu Val Lys Ser Ile Asn Gly His
 50 55 60
 Thr Gly Gln Lys Gln Gly Pro Leu Ser Thr Val Gly Asn Ser Thr Asn
 65 70 75 80
 Ile Lys Trp His Glu Cys Ser Val Glu Lys Val Asp Arg Gln Arg Leu
 85 90 95

Leu Asp Gln Lys Gly Cys Val Ile Trp Val Thr Gly Leu Ser Gly Ser
100 105 110

Gly Lys Ser Thr Leu Ala Cys Ala Leu Asn Gln Met Leu Tyr Gln Lys
115 120 125

Gly Lys Leu Cys Tyr Ile Leu Asp Gly Asp Asn Val Arg His Gly Leu
130 135 140

Asn Arg Asp Leu Ser Phe Lys Ala Glu Asp Arg Ala Glu Asn Ile Arg
145 150 155 160

Arg Val Gly Glu Val Ala Lys Leu Phe Ala Asp Ala Gly Ile Ile Cys
165 170 175

Ile Ala Ser Leu Ile Ser Pro Tyr Arg Thr Asp Arg Asp Ala Cys Arg
180 185 190

Ser Leu Leu Pro Glu Gly Asp Phe Val Glu Val Phe Met Asp Val Pro
195 200 205

Leu Ser Val Cys Glu Ala Arg Asp Pro Lys Gly Leu Tyr Lys Leu Ala
210 215 220

Arg Ala Gly Lys Ile Lys Gly Phe Thr Gly Ile Asp Asp Pro Tyr Glu
225 230 235 240

Pro Pro Leu Asn Cys Glu Ile Ser Leu Gly Arg Glu Gly Gly Thr Ser
245 250 255

Pro Ile Glu Met Ala Glu Lys Val Val Gly Tyr Leu Asp Asn Lys Gly
260 265 270

Tyr Leu Gln Ala
275